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Conductivity Studies on Hydroxide Ion Conductors  
in the Li-Al-O-H System  
at Intermediate Temperatures

by

Lie-Yea Cheng, Steven Crouch-Baker and Robert A. Huggins

Extended Abstract for a Paper to Be Presented at the  
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Honolulu, October 1987

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**Conductivity Studies on Hydroxide Ion Conductors  
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Temperatures**

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It has been demonstrated that, in a wet environment at intermediate temperatures, a material of nominal composition  $\text{Li}_5\text{AlO}_4$  will react with water to form  $\text{LiOH}$  (1,2). Under these conditions, " $\text{Li}_5\text{AlO}_4$ " will support continuous direct current in the presence of Pt electrodes. This has been interpreted in terms of hydroxide ion conduction, leading to the possibility of using " $\text{Li}_5\text{AlO}_4$ " as an electrolyte for the electrolytic decomposition of water vapor at intermediate temperatures (3,4).

The Li-Al-O-H quaternary phase diagram at intermediate temperatures has been constructed (5). Close inspection of this phase diagram reveals that compositions other than " $\text{Li}_5\text{AlO}_4$ " should behave in a similar manner. This work reports preliminary results concerning the DC conductivity of several compositions in the Li-Al-O-H system at intermediate temperatures.

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5. S. Crouch-Baker and R.A. Huggins, presented at the 6th International Conference on Solid State Ionics, Garmisch-Partenkirchen, FDR, Sept. 6-11, 1987.

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